BULLETIN OF THE SCHOOL OF EDUCATION INDIANA UNIVERSITY

Vol. XVII | January, 1941 | No. 1

Bureau of Cooperative Research
School of Education
Indiana University, Bloomington, Indiana

HENRY LESTER SMITH, Director
MERRILL T. EATON, Assistant Director

Price, 50 cents

For sale by the University Bookstore,
Bloomington, Indiana

This bulletin is indexed by title in the following:

Bibliographic Index

The current literature section of the

Loyola Educational Digest

Wilson Education Index

Entered as second-class mail matter September 30, 1924, at the post office at Bloomington, Indiana, under the Act of August 24, 1912. Published in January, March, May, July, September, and November of each year from the University Office, Bloomington, Indiana.

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BULLETIN OF THE SCHOOL OF EDUCATION
INDIANA UNIVERSITY

An Analysis of the Achievement of 164 Sophomores Enrolled in Teacher-Training Courses at Indiana University

by

HENRY LESTER SMITH
and
MERRILL T. EATON

A List of Bulletins in the Field of Education, Indiana University

by

KATHLEEN DUGDALE

Published by the
BUREAU OF COOPERATIVE RESEARCH
Indiana University

ACKNOWLEDGMENT

The authors of the bulletin are under special obligation to Oscar Philip Raush, assistant in the School of Education, who helped in collecting and tabulating the data; to the 164 sophomore students who very generously contributed their time; and to Miss Kathleen Dugdale, who assisted in organizing and editing the manuscript.

H. L. S.
M. T. E.

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An Analysis of the Achievement of 164 Sophomores Enrolled in Teacher-Training Courses at Indiana University

By Henry Lester Smith and Merrill T. Eaton

INTRODUCTION

In recent years teacher-training institutions have become conscious of the need for a shift of emphasis in education from that of merely imparting information to that of preparing the pupils to meet situations in a rapidly-changing social and economic society. They recognize the fact that the leaders in schools must be able to direct pupils to meet these changes in emphasis, must know how to adjust to these changes, and must make wholesome contributions of their own.

Various factors, such as health, intelligence, scholarship, personality, and vocational interests, must be considered in selecting teacher-training candidates who are to become such leaders in the teaching profession. While these and other qualifications are recognized as necessary in teachers, the limitations of the present study make it impossible to analyze all of these factors in the group being studied. In this investigation scholarship will be the only teacher qualification to be considered, and this factor will be taken up in its relation to sex, size of high school graduating class, school or college of the University in which enrolled, major teaching field, scholastic average based on two years of college work, and percentile rating made on the American Council on Education Psychological Examination.

Purpose of study.—Although newer educational philosophies have had the the effect of changing methods of teaching, it is still true that scholastic ability is one of the essential qualifications both for candidates in teacher-training institutions and for teachers in the public schools. Douglass (17:457),* in speaking on the topic of subject-matter preparation for teachers, says:

> No matter what may be the fundamental premise with respect to the objectives of education and the manner in which the subject-matter should be divided and organized for the purpose of instruction, it should be obvious that it is desirable that teachers be well trained in the fields of knowledge in which they work.

Teacher-training institutions must be vitally concerned with the subject-matter knowledge their graduates possess when entering the teaching profession.

* This number indicates that the quotation falls on page 457 of reference 17 in the bibliography.

The present study was undertaken in an attempt to determine to what extent such knowledge could be predicted for students entering professional training. As a basis for this prediction, the aptitude ranking of the entering college freshmen and the results of good standardized tests were used as an indication of the scholastic ability of the subjects involved. It is assumed that the student who possesses the most knowledge of the fundamentals in subject matter will later be the teacher who ranks highest in scholarship. Therefore, if we can determine the scholastic success of the former, we can to a large extent predict the scholarship factor of the latter. This assumption seems to be in conformity with the conclusions of most investigators in the field.

PREVIOUS INVESTIGATIONS

Although a number of studies have been made of the predictive value of aptitude and other tests for scholastic success in college and of the importance scholarship plays in future teaching ability, the results of these studies are not always in agreement. The conclusions drawn in some of these investigations are as follows:

Breckinridge (8) found that a higher scholarship requirement is demanded at some teacher-training institutions than at others, and that student bodies in turn become a more selective group. She does not believe, however, that there is much correlation between scholarship and teaching success.

The opinion of Ryans (47) is that we have no measuring instrument or combination of instruments capable of foretelling individual success or failure with a high degree of certainty.

In a study of selective techniques used in various colleges, Irwin (31) found that they range from almost arbitrary reduction of excess numbers to selective devices subjected to experimental trial and study. He says that often a critical score on some psychological test is used as a basis, and that dependence for selection is primarily placed on estimations obtained from factors that are more easily quantitatively measured.

Broom (9) believes that we may be safe in eliminating the lower five per cent in intelligence tests, but he does not favor set norms as bases for such action. He says instructional institutions are largely regional in their service, and a nation-wide standardized intelligence test cannot serve all regions with the same degree of effectiveness. He does not believe that selection on the basis of intelligence is a safe procedure in itself.

Allen (1) apparently doubts whether knowledge of subject matter is of very great importance in teaching success, and emphasizes the difficulty in setting up criteria for the selection of good teachers.

While some of the above investigators apparently doubt the validity of certain measuring instruments for predictive purposes, others feel that such predictions can be valid and that scholastic ability is an essential factor for teaching success.

In a study of college students who were of the lower ability group, Bent and Douglass (7) found that there was a greater proportion of

failures than there was in a group of students of average ability. Similar findings were made by Frasier (23) in a study at Colorado State Teachers College.

O'Dell (41) suggests that a combination of intelligence tests, high school marks, and results of entrance examinations may yield good predictive measures for college success, while Crawford (12) looks upon scholarship as the most objective basis for the selection of students, and states that the scholarship of students can be predicted. Crawford emphasizes the use of results of tests in aiding both high and low ability students.

Reeves and Russell (46) favor psychological tests over high school records in most cases for predictive purposes but express the opinion that for better results the two should be combined. They believe the average scholarship grade for the first year in college foretells to a large extent future scholastic success in college.

In a study of aptitude and achievement, Freeman (25) found greater correlation between aptitude test results and the scholastic record for the students' first years in college than he did for the latter years in college. He explains this by the fact that many of the lower aptitude groups withdraw from school after a year or two.

From an examination of the records made by graduates of Indiana State Teachers College, Shannon (49) discovered that the scholastic record in college was a good criterion of later success.

The relationship between ratings of student teachers in college and of first year teaching success was the subject of a study by Wagenhorst (59), who found very little correlation between scholarship and success. However, he notes that students who barely passed their college courses had very little success in teaching.

Butler (10), Landry (35), Madsen (38), Payne (42), and Ullman (58) all agree that scholarship is a highly reliable objective measure for predicting teacher success.

Scholastic ability, according to Anderson (3), is one of the factors most easily measured. Although he found the correlation low between scholarship and teaching success, his results indicate that he believes that academic training influences teaching ability.

The suggestion is made by Stuit (54) that the lack of relationship between scholarship and teaching success found in some studies may be due to the unreliability of instructors' marks. He is convinced that superior teachers are above average in scholarship and that scholarship is an important factor in the selection of teacher-training candidates.

In view of the fact that the majority of the studies mentioned agree that high scholarship is an important factor in teaching success, it seems advisable to make an analysis of the scholarship of students at Indiana University who are preparing to teach. The present study deals with the results of a group of tests given to 164 sophomores. Although Bent (6) believes it would be more feasible to select prospective teachers at the end of the junior year in college, we do not believe an added year would greatly change the results.

EXPERIMENTAL CONDITIONS

The present study was undertaken in an attempt to learn the scholastic abilities of a group of students who were preparing to enter the teaching profession. The experimental conditions of the study were as follows:

Subjects.—The subjects of this investigation were 164 college sophomores, all of whom were enrolled in a required course in advanced educational psychology at Indiana University. Since these subjects were not selected to participate in this study, it is assumed that they are typical of the undergraduate students at the University who are taking teacher-training courses. Information concerning these students at the time they entered the experiment is given in Table I. The sex, size of high school graduating class, school or college of the University in which enrolled, major teaching field, scholastic average based on two years of college work, and percentile rating of each subject on the American Council on Education Psychological Examination are given in this table.

Of the 164 students participating in the tests, 124 were women and 40 were men.

The high school classes in which these students were graduated varied from 4 to 1,200 pupils. Approximately 51, or more than 30 per cent, of the sophomores were graduated in classes of less than 50 students. The next largest groups, 37 and 35, came from graduating classes of 50 to 99 and 200 to 299, respectively. Only 26 subjects came from graduating classes of 300 or more, and 15 from classes of 100 to 199.

Four schools of the University—Arts and Sciences, Business, Education, and Music—were represented by the subjects. Nearly half of the students, 76, were enrolled in the College of Arts and Sciences and more than a third were enrolled in the School of Education. Only 16 of the subjects were enrolled in the School of Music and 12 in the School of Business.

These students were doing their major work in nine different teaching fields. A major teaching field as referred to here is the field in which the student is planning to teach. The highest number of students in any one teaching field was 35, in home economics, all of whom were women. The other teaching field groups were represented by the following numbers of students: English, 13; social studies, 18; commerce, 17; music, 16; elementary school, 14; foreign language, 13; physical education, 12; and mathematics and science combined, only 9. According to these figures, 50 per cent of the group were taking a major in either home economics, English, or social studies.

The scholastic averages of the students were based on grades received during their first two years of college work. The letter marks, A, B, C, D, and F, used at the University were transferred into percentage scores in order to facilitate the averaging of the marks. The letter mark "E" was not used since a student receiving an E is required to make up the work; therefore, the letter mark received as a final grade was used in this study. The numerical value given

TABLE I. SEX, SIZE OF HIGH SCHOOL GRADUATING CLASS, SCHOOL OR COLLEGE OF UNIVERSITY IN WHICH ENROLLED, MAJOR TEACHING FIELD, SCHOLASTIC AVERAGE, AND AMERICAN COUNCIL ON EDUCATION PSYCHOLOGICAL EXAMINATION PERCENTILE OF EACH OF THE 164 SOPHOMORES IN THIS STUDY

Student	Sex	Size of high school graduating class	School or college of University in which enrolled	Major teaching field	Scholastic average	American Council on Education Psychological Examination percentile
1	M	72	Arts and Sciences	Social studies	86	91
2	M	700	Education	Social studies	87	16
3	F	900	Education	Home economics	83	55
4	F	230	Arts and Sciences	Home economics	83	35
5	M	200	Music	Music	75	2
6	F	16	Arts and Sciences	Home economics	92	91
7	F	78	Education	Mathematics	89	32
8	M	114	Music	Music	80	49
9	F	28	Arts and Sciences	Home economics	77	32
10	F	120	Education	Social studies	84	54
11	F	300	Education	Physical education	81	41
12	M	1200	Education	Commerce	82	72
13	F	68	Education	English	87	40
14	F	25	Education	Home economics	77	7
15	F	275	Arts and Sciences	English	86	75
16	F	22	Business	Commerce	76	53
17	F	33	Education	Foreign language	90	95
18	F	236	Education	Social studies	87	95
19	F	305	Arts and Sciences	Home economics	89	77
20	F	270	Education	Social studies	81	84
21	F	34	Music	Music	85	79
22	F	24	Music	Music	88	47
23	F	120	Arts and Sciences	Foreign language	91	93
24	F	16	Arts and Sciences	Foreign language	94	53
25	M	15	Arts and Sciences	Science	84	21

TABLE I. (Continued)

Student	Sex	Size of high school graduating class	School or college of University in which enrolled	Major teaching field	Scholastic average	American Council on Education Psychological Examination percentile
26	F	60	Music	Music	88	21
27	F	57	Arts and Sciences	Home economics	87	57
28	F	200	Arts and Sciences	English	95	97
29	M	253	Education	Physical education	74	12
30	F	30	Business	Commerce	86	81
31	F	280	Education	Social studies	90	96
32	M	230	Education	Social studies	77	8
33	F	75	Education	Physical education	72	13
34	M	80	Music	Music	85	34
35	M	31	Arts and Sciences	Mathematics	91	96
36	F	255	Arts and Sciences	Foreign language	85	67
37	F	338	Arts and Sciences	Social studies	80	50
38	F	330	Arts and Sciences	English	86	62
39	F	526	Arts and Sciences	Home economics	90	90
40	M	120	Education	Physical education	79	9
41	F	230	Music	Music	89	90
42	F	125	Arts and Sciences	Home economics	87	53
43	F	10	Music	Music	89	86
44	M	11	Education	Physical education	73	31
45	F	25	Business	Commerce	82	49
46	M	4	Education	Elementary	85	21
47	M	203	Arts and Sciences	Foreign language	85	36
48	F	230	Arts and Sciences	English	80	32
49	F	47	Arts and Sciences	Home economics	83	11
50	F	21	Arts and Sciences	Home economics	92	97
51	F	302	Arts and Sciences	Foreign language	88	70
52	F	230	Education	Home economics	76	12
53	F	32	Education	Elementary	81	69
54	M	65	Music	Music	87	67
55	M	63	Education	Social studies	85	37

TABLE I. (Continued)

56	F	106	Business	Commerce	94	95
57	F	8	Arts and Sciences	Home economics	83	68
58	F	400	Education	Elementary	92	90
59	F	126	Education	Home economics	87	46
60	F	800	Music	Music	84	56
61	M	40	Education	Social studies	82	4
62	F	255	Arts and Sciences	Foreign language	90	94
63	F	996	Arts and Sciences	English	84	40
64	F	287	Business	Commerce	79	46
65	M	122	Arts and Sciences	Social studies	82	91
66	M	35	Education	Physical education	76	50
67	F	95	Education	Elementary	87	50
68	F	80	Music	Music	91	86
69	F	65	Arts and Sciences	Home economics	87	52
70	M	367	Arts and Sciences	English	73	88
71	F	52	Arts and Sciences	Social studies	92	87
72	F	100	Education	Physical education	84	20
73	F	40	Arts and Sciences	Home economics	80	67
74	F	61	Education	Elementary	86	76
75	F	21	Education	Social studies	80	89
76	F	305	Arts and Sciences	Mathematics	90	62
77	F	96	Arts and Sciences	English	90	96
78	F	800	Education	Elementary	91	96
79	M	120	Arts and Sciences	English	82	29
80	F	20	Arts and Sciences	English	82	29
81	F	1200	Arts and Sciences	Mathematics	90	91
82	F	96	Arts and Sciences	English	86	40
83	F	300	Education	Home economics	96	44
84	F	72	Arts and Sciences	Foreign language	92	98
85	F	64	Arts and Sciences	Home economics	86	88
86	F	18	Business	Commerce	82	70
87	F	50	Arts and Sciences	English	86	75
88	F	64	Arts and Sciences	Home economics	87	83
89	F	255	Education	Physical education	78	43
90	F	287	Business	Commerce	88	99

TABLE I. (Continued)

Student	Sex	Size of high school graduating class	School or college of University in which enrolled	Major teaching field	Scholastic average	American Council on Education Psychological Examination percentile
91	M	80	Arts and Sciences	Science	81	96
92	F	31	Arts and Sciences	Social studies	80	70
93	F	250	Arts and Sciences	Home economics	82	76
94	F	260	Business	Commerce	85	92
95	F	50	Education	English	85	36
96	F	110	Arts and Sciences	Home economics	84	96
97	F	52	Arts and Sciences	Home economics	79	32
98	F	11	Arts and Sciences	Home economics	82	70
99	M	20	Arts and Sciences	Science	87	92
100	F	255	Arts and Sciences	Home economics	83	24
101	F	50	Education	Physical education	82	53
102	F	96	Music	Music	77	53
103	F	38	Arts and Sciences	English	95	94
104	F	1200	Arts and Sciences	Home economics	82	93
105	F	96	Education	Elementary	86	62
106	F	99	Education	Social studies	76	76
107	F	16	Business	Commerce	91	90
108	F	52	Arts and Sciences	Foreign language	77	38
109	F	64	Arts and Sciences	Home economics	80	73
110	F	88	Education	Home economics	95	87
111	F	250	Education	English	80	21
112	M	84	Education	Foreign language	85	86
113	F	32	Arts and Sciences	Home economics	82	46
114	M	18	Education	Commerce	89	85
115	F	65	Arts and Sciences	Home economics	86	99
116	F	20	Arts and Sciences	Home economics	84	19
117	M	370	Arts and Sciences	English	81	94
118	M	200	Education	English	77	1
119	M	255	Arts and Sciences	English	76	72
120	F	255	Arts and Sciences	English	88	94

TABLE I. (Continued)

121	F	250	Education	Elementary	94	56
122	F	199	Arts and Sciences	Foreign language	88	85
123	F	31	Education	Commerce	86	80
124	F	265	Education	Elementary	89	96
125	F	800	Education	Commerce	84	13
126	M	42	Music	Music	83	82
127	F	255	Arts and Sciences	English	88	64
128	F	300	Education	English	89	9
129	F	285	Education	Elementary	82	52
130	M	194	Education	Mathematics	88	46
131	F	200	Music	Music	87	89
132	M	54	Music	Music	88	80
133	F	25	Arts and Sciences	Foreign language	88	17
134	F	255	Education	Elementary	82	32
135	F	33	Arts and Sciences	Home economics	77	5
136	M	31	Education	Social studies	84	44
137	F	30	Arts and Sciences	Home economics	84	61
138	M	392	Education	Foreign language	92	99
139	M	13	Arts and Sciences	Social studies	81	84
140	F	54	Music	Music	86	43
141	M	800	Business	Commerce	90	53
142	F	12	Business	Commerce	86	58
143	F	350	Education	Elementary	88	79
144	M	230	Education	Elementary	77	23
145	M	230	Arts and Sciences	English	81	80
146	F	350	Education	Elementary	82	14
147	F	60	Business	Commerce	90	61
148	F	42	Education	Home economics	80	48
149	F	50	Arts and Sciences	English	87	77
150	M	40	Arts and Sciences	English	85	88
151	F	25	Education	Home economics	90	28
152	F	128	Education	Physical education	71	6
153	F	850	Arts and Sciences	Social studies	76	34
154	F	32	Arts and Sciences	English	92	94
155	F	263	Arts and Sciences	English	92	77

TABLE I. (Continued)

Student	Sex	Size of high school graduating class	School or college of University in which enrolled	Major teaching field	Scholastic average	American Council on Education Psychological Examination percentile
156	F	96	Arts and Sciences	Social studies	86	95
157	F	25	Arts and Sciences	Home economics	84	55
158	M	42	Education	Physical education	79	28
159	F	20	Education	Physical education	78	28
160	F	44	Arts and Sciences	English	83	67
161	F	255	Arts and Sciences	English	81	63
162	F	15	Education	Commerce	81	3
163	M	175	Arts and Sciences	English	88	26
164	F	17	Arts and Sciences	English	90	38
Range					71-96	2-99
Average					84.6	

to the marks was in accordance with the scale used by the University. The marks ranged from 71 to 95 per cent. About two thirds of them were between 80 and 89, while the other third was approximately evenly divided between the group that did superior work and the group that made marks below 80.

On the American Council on Education Psychological Examination, which is taken by all entering students at Indiana University, the 164 subjects ranked somewhat above the average, making a median percentile of 62.5. Percentile ratings of 91 to 100 were made by 30 members of the group, while only 10 subjects fell below the tenth percentile. Women were definitely above men on this test; Arts and Sciences and Business students were above those in Education and Music; students taking a major in foreign language and social studies made considerably higher ratings than those in any other major teaching field group, while physical education students made the lowest rating; and those with high scholastic averages made high percentile ratings on this test, while those with low averages made low ratings. There was little difference in the ratings made by those coming from high school graduating classes of different sizes, a finding contrary to that of Allison and Barnett (2) who reported statistically reliable differences in favor of those from the larger schools.

Tests used in study.—In testing ability in English, the Cooperative English Test, Provisional Form PM, was used. This is a multiple-choice test in English usage, spelling, and vocabulary and takes 70 minutes to administer. McCullough and Flanagan (37) have studied the validity of this test and have found high correlation coefficients between the three parts of the test and the combined parts of the test when correlated with other valid measures. Gladfelter (26) found the test valuable in predicting college success and reports that the usage part of the test is as valuable as the whole test for predictive purposes.

In measuring the reading ability of the group the Iowa Silent Reading Test, New Edition, Advanced Test Form AM, was given. This test is designed to measure rate-comprehension, directed reading, poetry comprehension, word meaning, sentence meaning, paragraph comprehension, and location of information. The test has proved itself to be highly reliable and valid in measuring essential abilities in the silent reading process on the high school and college level.

In testing the general achievement of these students, the Cooperative General Achievement Test, Form P, was used. This test is issued in three booklets, surveying mathematics, social studies, and natural science. Each part takes 40 minutes to give and is machine scorable. Hanna (28) found the Cooperative Test in Mathematics valid for predictive purposes. In this study, however, the Cooperative Test in Natural Science was found to be unsatisfactory in that it failed to differentiate sufficiently between students.

In general it may be said that all the tests used in this study were objective type tests of acknowledged merit. The superiority of the separate objective tests for such purposes as this study are pointed out by Crawford and Burnham (13).

Testing procedure.—All tests were given under conditions closely approximating those of the actual classroom. Distractions were carefully avoided and the directions for administering the tests were rigidly followed. The checking of score sheets on an I.B.M. scoring machine, using a key provided by the publishers of the tests, assured absolute accuracy in scoring. Raw scores on all the achievement tests were converted into scaled scores. Standard norms of the tests were used for comparative purposes but unfortunately these could not always be obtained for college sophomores. The norms used for the Cooperative English Test were based on scores of college sophomores, those for the Iowa Silent Reading Test were based on scores of high school seniors, and those for the Cooperative General Achievement Test were based on scores of entering freshmen in Liberal Arts colleges.

RESULTS

The scores made by each of the 164 subjects on the various parts of the three tests used in this study are given in Table II. The mean score made on each test is given in the summary of this table as well as the standard norms for groups as nearly as possible on the same level in school.

According to these figures the subjects of this experiment were superior to the norm in average score on every test taken except mathematics. Since the standard used on this test is based on entering freshman scores, the sophomore group being studied should not have fallen below the standard. In reading, the superior score of the college sophomores is to be expected, since the standard norm with which it is compared is based on twelfth-grade scores. The results obtained on the Cooperative English Test show that the sophomores used in this study were definitely superior in English usage, spelling, and vocabulary to the sophomores used in developing the standard norm.

The scores made on these tests were studied in their relation to each of the factors given in Table I. The subjects were grouped according to their sex, size of high school graduating class, school or college of the University in which enrolled, major teaching field, scholastic average in the first two years of college work, and percentile rating on the psychological examination taken at the time of entrance into the University, and the average scores of these groups were computed and compared. Limitations of space prevent the inclusion of tables giving the results, but the general findings are discussed in the following paragraphs:

Sex.—When the group was divided according to sex, it was found that the women made consistently higher scores than the men on all parts of the English and reading tests except vocabulary, where they fell 0.1 point below the men. In mathematics, social studies, and natural science, however, the men made higher averages than the women. This difference was greatest in the social studies, where the average score was 5.5 points higher for men than for women. The range of scores was a little larger among the women than among the men in five of the eight scores.

TABLE II. SCORES MADE BY EACH OF THE 164 SOPHOMORES ON EACH OF THE ACHIEVEMENT TESTS

Student	Cooperative English Test				Iowa Silent Reading Test	Cooperative General Achievement Test		
	Usage	Spelling	Vocabulary	Total English		Mathematics	Social studies	Natural science
1	68	65	72	68	87	61	56	59
2	47	54	59	54	94	56	78	64
3	62	58	64	62	84	35	50	56
4	64	78	71	73	99	55	69	61
5	52	44	36	44	65	54	42	45
6	63	81	59	69	93	68	54	55
7	58	55	52	55	86	71	72	55
8	54	51	56	54	80	49	49	46
9	51	53	61	55	93	44	54	60
10	63	53	71	63	93	56	71	59
11	50	52	49	50	76	59	46	52
12	59	72	79	71	87	56	76	59
13	67	70	72	71	83	49	52	56
14	50	56	61	56	85	48	55	56
15	57	62	73	65	100	51	60	52
16	59	56	60	59	88	53	65	59
17	77	83	91	86	90	62	69	59
18	67	68	61	66	97	64	66	54
19	75	70	67	72	83	61	50	57
20	61	61	60	61	90	66	70	56
21	63	61	55	60	83	71	55	59
22	59	56	59	59	85	59	58	55
23	69	66	74	71	102	71	64	55
24	63	76	71	71	93	51	72	60
25	49	49	60	53	73	51	74	64
26	58	51	59	56	81	51	62	53
27	59	59	55	58	85	60	54	60
28	70	78	81	78	99	65	75	61
29	50	29	52	41	71	49	49	56
30	59	55	60	59	100	58	66	59
31	71	62	77	71	107	68	72	64
32	47	53	44	48	75	49	50	63
33	48	54	53	51	86	48	53	58
34	52	65	65	61	73	53	64	56
35	63	68	73	69	90	71	78	70
36	67	58	78	69	101	60	71	64
37	65	56	60	61	87	49	80	56
38	57	68	69	66	84	55	54	67
39	53	54	67	59	96	59	68	65
40	50	29	52	41	59	47	59	45
41	66	83	82	79	111	57	67	56
42	58	53	47	53	84	67	42	52
43	61	69	54	62	96	56	51	52
44	38	40	49	42	63	48	64	56
45	61	62	53	59	82	53	58	55
46	47	61	58	56	81	63	66	64
47	68	62	55	63	82	41	62	55
48	57	70	63	64	88	48	68	56
49	53	50	51	51	83	55	47	61
50	78	69	68	73	91	70	64	63
51	77	80	70	78	82	54	46	55
52	49	55	52	52	82	31	45	53
53	60	66	61	63	88	59	71	58
54	60	58	66	62	82	61	55	61
55	58	53	52	55	90	68	76	64
56	67	70	77	73	102	70	72	66
57	64	52	65	61	97	56	64	56
58	66	56	67	64	87	54	67	62
59	66	78	94	82	101	66	75	68
60	47	57	56	54	84	50	56	53

TABLE II. (Continued)

Student	Cooperative English Test				Iowa Silent Reading Test	Cooperative General Achievement Test		
	Usage	Spelling	Vocabulary	Total English		Mathematics	Social studies	Natural science
61	43	37	53	44	65	56	62	55
62	71	76	77	76	89	62	63	63
63	61	66	55	61	83	65	60	53
64	61	65	51	60	79	50	57	56
65	54	59	70	62	91	52	79	59
66	50	53	52	52	82	60	49	55
67	62	53	56	56	80	52	61	60
68	64	61	63	64	101	52	66	56
69	56	53	55	55	92	57	62	69
70	73	62	74	71	89	71	65	62
71	77	76	74	78	101	61	73	54
72	48	54	55	52	96	53	47	67
73	61	66	66	65	93	51	68	62
74	72	69	58	68	103	66	68	66
75	69	56	61	63	89	61	60	61
76	67	62	58	64	89	71	67	54
77	70	76	70	74	97	58	70	55
78	74	68	59	68	89	68	48	66
79	59	59	62	61	65	52	56	61
80	56	46	59	54	79	51	53	51
81	65	70	59	66	85	81	54	52
82	65	51	56	58	85	53	53	60
83	48	40	52	46	76	53	53	62
84	68	69	77	73	116	64	67	58
85	68	66	67	68	93	55	65	60
86	80	68	54	69	90	56	50	56
87	65	57	80	69	86	51	73	59
88	75	58	55	64	94	56	66	62
89	65	51	53	57	89	49	56	61
90	75	76	72	76	112	65	60	62
91	68	68	77	73	104	68	81	63
92	61	57	60	60	96	56	57	57
93	76	62	63	69	90	66	64	60
94	65	59	68	65	109	64	69	55
95	55	76	69	68	87	43	58	59
96	72	76	83	79	103	66	78	63
97	53	53	51	52	78	53	55	64
98	58	78	63	68	82	53	55	61
99	63	62	69	66	93	74	76	68
100	47	50	47	48	78	51	62	60
101	53	55	53	54	82	56	54	59
102	62	53	67	61	80	53	53	53
103	75	69	61	70	95	71	69	64
104	79	61	79	75	87	68	66	70
105	67	66	61	66	100	56	55	58
106	45	56	48	50	81	48	47	53
107	81	76	81	82	98	67	81	66
108	48	54	54	52	82	51	64	54
109	59	52	69	61	89	51	56	59
110	75	78	81	80	109	54	71	62
111	68	74	69	72	83	61	69	54
112	51	66	74	65	85	57	73	60
113	44	29	49	40	84	60	56	62
114	63	78	65	70	98	65	70	62
115	79	76	90	84	107	60	83	65
116	55	56	57	57	81	51	56	63
117	64	70	88	76	99	63	79	68
118	43	53	58	51	78	35	54	52
119	74	66	79	75	84	57	79	62
120	79	78	77	80	109	62	71	60

TABLE II. (Continued)

Student	Cooperative English Test				Iowa Silent Reading Test	Cooperative General Achievement Test		
	Usage	Spelling	Vocabulary	Total English		Mathematics	Social studies	Natural science
121	65	54	69	64	98	57	62	64
122	66	66	66	67	101	55	65	55
123	69	66	74	71	88	66	71	67
124	85	80	76	79	89	65	67	61
125	55	78	53	63	73	51	47	52
126	60	57	61	60	96	61	62	55
127	72	66	66	69	85	56	56	56
128	54	64	59	60	75	35	56	54
129	59	59	58	59	67	54	47	57
130	69	58	76	69	95	86	84	70
131	72	62	73	70	92	61	64	62
132	56	54	60	57	86	67	67	56
133	41	51	54	49	76	43	47	58
134	54	66	58	60	83	56	47	59
135	47	45	43	45	82	50	40	55
136	48	50	67	55	82	49	50	68
137	52	56	55	55	91	51	67	56
138	66	69	79	73	106	54	72	57
139	61	53	68	61	104	64	79	64
140	60	80	61	68	78	55	48	54
141	65	61	73	71	78	60	88	58
142	52	56	61	57	85	57	65	59
143	65	61	71	67	99	61	62	63
144	48	56	61	55	79	51	58	53
145	77	70	75	76	96	63	69	60
146	52	56	52	54	83	52	49	58
147	61	61	63	63	97	64	63	57
148	41	56	56	51	59	46	52	51
149	63	55	71	64	104	59	51	58
150	61	54	66	61	93	63	65	67
151	59	74	82	73	84	50	70	56
152	46	51	46	47	77	38	59	50
153	47	53	49	50	74	51	63	55
154	68	62	61	65	95	65	73	69
155	61	78	70	71	108	61	66	55
156	59	66	71	66	87	57	67	59
157	57	70	49	59	78	54	48	62
158	52	54	59	55	82	58	62	66
159	41	40	46	42	82	47	48	60
160	63	70	72	70	87	48	65	56
161	62	56	69	63	90	54	56	60
162	43	39	24	34	74	53	51	51
163	49	50	62	54	76	56	69	66
164	53	62	60	59	92	44	56	58
Average	60.7	61.1	63.2	62.4	88.2	57.0	62.0	58.9
Standard norm	58.3	56.8	61.3	59.3	84.0	59.5	58.0	58.7

Size of high school graduating class.—When the students were grouped according to size of high school graduating class, no pronounced differences were found between the averages made by the groups nor were the differences in favor of any certain group. The medium large high schools had slightly better scores than the others, schools with enrollments of 100 to 199 receiving the highest scores in vocabulary, mathematics, and social studies and those with enrollments from 200 to 299 receiving the highest scores in English usage, spelling, total English test, silent reading, and natural science. The schools with the smallest enrollment also made high scores in natural science. The lowest score in silent reading was made in the group of very large high schools, while the group having enrollments of 50 or less made the lowest scores in English usage, vocabulary, total English test, and social studies. The widest range of the scores was usually found in the medium large high schools. The standard error of the differences of these scores indicated that none of these differences were significant, however. It would seem, therefore, not to be justifiable to state that of the size of the high school graduating class had any effect on these test results.

School or college of University in which enrolled.—The subjects who were enrolled in the School of Business made the highest score made by those in any school on five out of the eight tests, while those in the College of Arts and Sciences made the highest score on the other three. The lowest scores on all tests were made either by those in the School of Education or by those in the School of Music. The widest range of scores was made by students in the School of Education on all tests except the social studies test.

The largest differences in scores made by any two groups on any of the tests were differences of 9.8 between the School of Business students and the School of Music students in spelling, of 8.5 between the College of Arts and Sciences students and the School of Music students in spelling, of 8.4 between the School of Business students and the School of Music students in social studies, and of 8.4 between the School of Business and the School of Education students in English usage. The smallest differences were a difference of 0.1 between the College of Arts and Sciences students and the School of Business students in silent reading, a difference of 0.2 between the School of Education students and the School of Music students in vocabulary, and a difference of 0.4 between the School of Business students and the School of Education students in natural science. The only significant differences found between the scores of the various groups showed that the students in the School of Business were definitely superior to those in the School of Music in spelling and that those in the College of Arts and Sciences were definitely superior to those in the School of Music in both social studies and natural science. However, it must be remembered that groups enrolled in the School of Business and the School of Music were so small that the results cannot be considered conclusive.

Major teaching field.—There is also a certain limitation to the value of a study of the average scores made by the students when grouped according to major teaching field because of the fact that there are so few students in some of the groups. Certain trends, however, seemed pronounced.

The foreign language group made the highest average scores on all of the English and reading tests, while the mathematics and science group made the highest scores in mathematics, social studies, and natural science. The English group made a score not far below that of the foreign language group on all of the English tests, while the commerce group made the second highest score in reading and mathematics, the social studies group in social studies, and the home economics group in natural science. The low score was made by the physical education group on all tests except natural science in which it was next to the low score made by the music students.

There was not a great variety in the range of scores made by the different groups, although in three of the four English scores the commerce group had the widest range of any group.

The difference between the means of scores made by the various groups was highest between the foreign language and physical education groups in five of the eight tests. There was no difference in scores between the English and social studies groups in natural science or between the English and home economics groups in mathematics.

The statistical reliability of the differences between the means made by these groups showed that in English usage and spelling all groups showed a significant superiority over the physical education group. In vocabulary and total English tests, the English and foreign language groups showed a superiority approaching significance over the other groups and all other groups showed a significant difference over the physical education group. In silent reading the English, commerce, foreign language, home economics, and social studies groups showed a significant difference over the physical education group, while the superiority of the other groups over the latter group very closely approached significance. As might be expected, the mathematics and science group showed a significant difference over some of the other groups on the mathematics test. On the social studies test most of the groups showed a significant superiority over the physical education group with the English, social studies, and mathematics and science groups showing a very noteworthy superiority over some of the other groups. The differences in the natural science test scores were of little significance.

There seemed to be a tendency for students to make better scores in those subjects which were closely related to their teaching fields. In the case of the physical education group, the rather low scores made on these tests were probably partly due to the fact that the students in this group had taken an active part in athletics in school, and this had taken time from their academic studies.

Scholastic average based on two years of college work.—When the subjects were divided according to the average marks made during the

first two years of college, it was found that the average test scores almost paralleled these marks. The group having a scholastic average of 90 or above made the highest scores on each of the tests, those between 85 and 89 made the next highest scores, those between 80 and 84 made the next highest scores, and those whose averages were below 80 consistently made the low mean scores on the various tests.

The widest range of scores on all tests was made by either the 80 to 84 or the 85 to 89 groups. On all tests except natural science there was a wide difference in scores between the highest and lowest scholarship groups. This was especially true on the English and silent reading tests. With the exception of the natural science test, most of the differences between the means were either statistically reliable or highly significant. On none of the tests, however, did the difference between the scores of the two middle scholarship groups reach statistical reliability.

Percentile rating made on American Council on Education Psychological Examination.—When grouped according to percentile rating on the American Council on Education Psychological Examination, the average test scores nearly paralleled the percentile ratings in much the same way as they did the scholastic averages, that is, those subjects with high ratings were those who made the high scores on these tests. On six of the eight tests the widest range in scores was made by the group having a percentile of 26 to 50. However, on the whole, the spread of scores showed very little consistency. In all cases, the differences between the means were greatest between the highest and the lowest percentile groups. On all tests except science the majority of the differences in means were statistically reliable.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

From the results of this study the following conclusions may be drawn:

1. There was considerable variation in the scholastic achievement of the students who participated in this study.

2. In general, the women were superior to the men in English and silent reading. The men, on the other hand, showed better results on the mathematics, social studies, and natural science tests.

3. The size of high school class in which the subjects were graduated apparently did not have any effect on their test scores.

4. The subjects who enrolled in the College of Arts and Sciences or in the School of Business made higher scores on the tests than did those who enrolled in the School of Education or the School of Music.

5. There seemed to be a tendency for the subjects who made the higher scores on these tests to select foreign language, mathematics and science, or English for their major teaching field, while many of those who made low scores selected physical education.

6. Many of the high scores in the College of Arts and Sciences may be accounted for by the fact that students selecting foreign lan-

guage, mathematics and science, or English as a major teaching field were all enrolled in the College of Arts and Sciences and these were the highest ranking teaching-field groups. On the other hand, the lower averages of those enrolled in the School of Education were probably partly due to the fact that those preparing to teach physical education (the group which made the lowest scores on the tests) were enrolled in that school.

7. There was a very close relationship between the results of the tests and the average mark made by the subjects in their first two years of college work.

8. There was a very close relationship between the results of the tests and the percentile ranking made by the subjects on the American Council on Education Psychological Examination.

As has been stated earlier in this study, a number of the groups used for comparative purposes were very small. Therefore the statements made above should not be taken as conclusive—they merely indicate the trends in a group of subjects considered as typical of students taking teacher-training courses at Indiana University. However, from the results of this study we believe the following recommendations could be made:

1. Since marks received in courses taken during the first two years of college agree closely with results of these achievement tests, the high school scholastic record made by these students might be used when the students first enter the University as one indication of their possible future success in teacher-training courses.

2. Since the percentile rating made by these students on the American Council on Education Psychological Examination agreed closely with the results of these achievement tests, a test of this kind would be of value in predicting success in professional work.

3. It is recommended that an aptitude test designed to measure the ability of students enrolling in courses leading to the field of teaching also be given as a prognostic measure of teaching success. Such a test would deal more nearly with the knowledge and other factors required of teachers than does a general aptitude test on academic ability such as the American Council on Education Psychological Examination.

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A List of Bulletins in the Field of Education, Indiana University

By KATHLEEN DUGDALE

The School of Education at Indiana University has published the following bulletins. All of these may be obtained from the University Bookstore for 50 cents unless otherwise noted.

Proceedings of the High School Principals' Conference (November 23 and 24, 1923). Vol. I, No. 1, 1924. 85 p. (Supply exhausted.)

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Proceedings of the Eleventh Conference on Educational Measurements. Vol. I, No. 3, 1925. 141 p.

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